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CIVILIAN NUCLEAR POWER:
PROBLEMS AND PROSPECTS

Wolfgang Koerner

Political and Social Affairs Division
Research Branch
Ottawa

May 1985



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BACKGROUND PAPER FOR PARLIAMENTARIANS


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CIVILIAN NUCLEAR POWER: PROBLEMS AND PROSPECTS

INTRODUCTION

Civilian nuclear power has become one of the most controversial issues in advanced industrial societies. "Pennsylvania is everywhere" has become the rallying cry, not of misguided modern-day Luddites, but, of a concerned cross section of European and North American society. State and industry are today confronted with a penetrating critique that has aroused anxiety, not only about the acceptability of certain technologies, but also about the effect that the adoption of these technologies will have on the relationship between the "state" and "civil society". Aside from the obvious and immediate concerns over potential hazards, the anti-nuclear movement has come to focus on the social and political properties of this technology -- its effect on the forms of authority and power, the concepts of freedom and order, the distribution of political and economic resources, the very fabric of political life. For the promoters of the technology, nuclear power represents a solution to the energy problem and is, therefore, viewed as a guarantee of our well-being.⁽¹⁾ Hence, the traditional "rationality" of the scientist gives way to the "whims" of the utopian.

(1) Dorothy Nelkin and Michael Pollack, The Atom Besieged: Extraparliamentary Dissent in France and Germany, The MIT Press, Massachusetts, 1981, p. 1. To a large extent, public concerns about nuclear power follow from a set of technical problems unique to this technology: the low-level radiation released during normal operation of a power plant, the unlikely but catastrophic possibility of a large-scale accident, the routine environmental effects of heated effluents, the problems of radioactive waste disposal, and the potential military use of the plutonium produced as a by-product of reactor operation.

During the early era of nuclear development the optimistic tones were often founded on a mixture of ignorance and self-deception which obscured many of the hazards and problems later found to be associated with nuclear power. An important aspect of the industry's initial confidence was the assurance that any problems could easily be solved with the advance of scientific development. This view "was persuasively promulgated and the ideology that underlay it steadily began to be reflected in community attitudes." (1)

However, nuclear power has today come to symbolize some of the major problems of advanced industrial society. These include worries over the effect of technological change on traditional values, the gradual industrialization of rural areas, the concentration of economic activities, the centralization of decision-making power, and the pervasive intrusion of government bureaucracies. Amongst the various critics of the industry, it has become fashionable to talk less of nuclear energy and more about the impending nuclear society and its attendant consequences. The "passion underlying the debate, the ability to mobilize a broad array of different groups to oppose government nuclear programs follows from the association of this advanced technology with such ubiquitous social and political concerns." Thus, although much of the debate still dwells on technical issues of safety, the "challenge to nuclear power has assumed the character of a moral crusade." (2)

Robert Jungk, one of the more severe European critics of nuclear energy, has come to emphasize the socio-political implications inherent in the adoption of this technology. While the prospects of nuclear accidents and the potential misuse of nuclear energy are deemed serious, what is considered equally, if not more, dangerous is the necessary degree of social control required to ensure "safety". Ensuring the safe application of nuclear technology is more than a merely technical matter. As Jungk argues:

(1) Jim Falk, Global Fission: The Battle Over Nuclear Power, Oxford University Press, Oxford, 1982, p. 19.

(2) Nelkin and Pollack, p. 2.

If only technical measures were involved, the problem would be purely one for the engineers to solve and, in view of the enormous costs concerned, for the economists as well. But this new human invention, because of its enormous capacity to destroy, must be kept well away from ordinary humanity, with its propensity for error, its weaknesses, its anger, its cunning, its hates ... in a way that applied to none of its predecessors. If our nuclear power plants are to be well-enough protected to be totally immune to these risks, the inevitable consequence is a society dominated by prohibitions, surveillance and constraints, all justified by the magnitude of the danger.(1)

While not all opponents would go as far as Jungk in the implications they draw, many do consider the decision to opt for nuclear energy to have been the logical consequence of a technological policy that gave precedence to material growth over all other human interests. In opposition to the "hard path" chosen by most societies, in favour of nuclear energy, they proposed a "soft path" based upon the better exploitation of conventional sources of energy along with a simultaneous development of "decentralized and innocuous alternative energy."(2)

In many respects, particularly in Europe, the widespread protest against nuclear policy is also a struggle for change in the organization of power and influence; the issue is not only one of safety but of political rights and obligations. The anti-nuclear movement takes place in the "context of other extraparliamentary and emancipatory movements -- ecologists, feminists, regional autonomists -- that emerged simultaneously

(1) Robert Jungk, The Nuclear State, trans. by Eric Mosbacher, John Calder, London, 1979, p. viii.

(2) Ibid., p. x-xi. See also: John J. Berger, Nuclear Power: The Unviable Option, Rampart Press, Palo Alto, 1976. For a discussion of the comparative cost advantage of nuclear energy see, Colin Sweet, The Price of Nuclear Power, Heinemann, London, 1983; Peter Faulkner, The Silent Bomb, Random House, New York, 1977. For a discussion of the benefits of nuclear energy see, Petr Beckmann, The Health Hazards of Not Going Nuclear, The Golem Press, Colorado, 1976. For a brief international comparison of the costs of nuclear energy see, Christopher Flavin, Nuclear Power: The Market Test, World Watch Institute, December 1983, p. 43-65.

during the 1960s and 1970s with their persistent challenges to the prevailing political and social order."(1)

In comparatively examining the various movements it quickly becomes apparent that the manner in which critics confront their government depends on a variety of factors including: legal and administrative arrangements, available participatory channels, and anticipated government reactions. Thus the "emergence and development of the anti-nuclear movement, its constituency, its access to expertise, its forms of expression, and its relationship to existing political institutions can be expected to reflect the social and political context." The nuclear opposition challenges not only a technology but also political legitimacy. The technical and financial requirements of having a successful nuclear policy has necessarily brought government into increasingly significant partnership with industrial interests. It is this close tie between government and industry that has become a major source of public mistrust. In a democratic society, governments are "constrained by their need to both maintain social order and convey an image of democratic decision-making." In their response to nuclear protests governments then find themselves pressed between the constraints imposed by their alliance with industrial interests and the demands for public involvement and local control from an ever-critical public. It is little wonder that we then find political authorities oscillating between declarations of democratic goodwill, expressed in participatory mechanisms, and the repression of nuclear protest. The degree of oscillation differs according to the socio-political context.(2)

The major questions which arise for policymakers are:

- a) What is the significance of the persistent opposition to technology, in particular to nuclear power?
- b) Is this opposition ephemeral and likely to pass with little long-term effect, a visceral reaction against modernizing tendencies?
- c) Or can it be considered a significant movement with a vision of a future social order and a promise of basic structural change?

(1) Nelkin and Pollack, p. 2.

(2) Ibid., p. 5.

How governments answer these questions for themselves goes a long way in determining how they attempt to manage the protest movement. Initially, the tendency was to either dismiss it as a consequence of public ignorance and inadequate information or to attribute it to a radical fringe manipulating public fear for its own ends. However, as the movement gained momentum it quickly became apparent that it was a far more complex phenomenon than originally thought. Indeed, the anti-nuclear protest quickly grew into a "social" movement with a broad popular base and an ideology that challenged established political institutions. In all western industrialized countries the nuclear protest has been sustained by the sympathetic public attitudes of a heterogeneous class constituency. It comprises a "network of committed associations and scientific activists, and its themes convey a critique of the state that has captured the support of diverse groups." This is especially true in Europe where the scarcity of unpopulated land, and the relatively large number of nuclear power sites are "compelling factors in shaping public attitudes."⁽¹⁾

Another aspect of the "nuclear question" that proves particularly important is the role of regulation. Nuclear power is part of a special class of technology that has come to command increasing public and regulatory attention. The substances and technologies in this class have several characteristics in common. They are reasonably new to the marketplace, they are expected to receive widespread use, and there are substantial uncertainties about the consequences of their large-scale use. Furthermore, the uncertainties over the large-scale use of these technologies and substances cannot be resolved easily, since experience with the product is limited and lab-scale tests leave many questions unanswered. Thus, "regulation of this class requires weighing generally known, immediate benefits against generally unknown, deferred, and possibly very large hazards."⁽²⁾

(1) Ibid., p. 5-6.

(2) Elizabeth S. Rolph, Nuclear Power and the Public Safety, Lexington Books, Lexington, Massachusetts, 1979, p. xiii. Examples of hazards that fit into the group include poisonous substances, often with mutagenic or carcinogenic properties (for example, benzene, radioactive material, certain pesticides, asbestos) and substances or technologies that threaten to disrupt the ecological balance in a fundamental way (fluorocarbons, DDT, nuclear power).

Not only do these factors necessitate regulation but, because of the potential hazards involved, they impose a special stress on the regulatory process itself. First, the "stakes are clearly very high, and therefore people are apt to feel strongly and push hard on the political system." Secondly, individuals tend to show strongly biased preferences when uncertainties are great or probabilities low but the stakes high. And finally, given the inherent uncertainties of matters under consideration, demands for regulatory flexibility and change become inevitable. As a consequence, the regulatory environment has shifted markedly. The "rapidity of technological evolution is, in many instances, outstripping our ability to assess the risks of application." The general public has a much better awareness of the risks and is increasingly inclined to expect government to intervene as its protector.(1)

The problems confronted by the regulatory process, with respect to hazardous products and technologies include: uncertainty, distributional differences, differing values, the essentially political nature of the regulatory process. The uncertainty factor is perhaps the most disconcerting for regulators. Because the technology is new and untried, regulators cannot judge how likely it is to be "misused". Again, because the technology is new "there are major experimental and theoretical gaps in our understanding of its impact on man and his habitat." As uncertainty with respect to these matters increases the public comes to show a diminishing willingness to rely on traditional sources of expertise for safety assessments and policy judgements. This means that staff recommendations from regulatory bodies or assessments or recommendations from independent scientists or scientific organizations do not go unchallenged and cannot automatically provide the basis for regulatory decisions. Uncertainties are further highlighted by having competing scientific opinion debated in public forum.(2)

The problem of distributional differences arises from the fact that the risks and benefits of using a new technology or substance are

(1) Ibid., p. 1.

(2) Ibid., p. 2.

most frequently distributed over different populations. Thus, we find that nuclear power plants which produced electricity primarily for use in major urban centres are located in remote rural areas. It is the nearby rural residents and population centres that bear the greater risk and this disparity makes equity both hard to define and achieve. Related to this is the third obstacle, namely the fact that different segments of society attach different values to economic growth and to freedom from risk. Trade-offs between the two must inevitably be made, but "regulatory authorities find themselves hard pressed to make them." Pressure on the regulatory process comes from two sources. On the one hand, one has the private lobbies who have invested a great deal of money in new developments and for whom a lengthy regulatory process is an added financial burden. On the other hand one has the public whose attitude toward "risk" seems to be growing more conservative; probably due to the fact that it has become more aware of potential risks. The net result is a "growing public skepticism and efforts to constrain use of processes and substances that present a potential large-scale threat." (1)

Finally, regulation is, of necessity, a political process. Precisely "because there are uncertainties and distributional differences and differences in values, and because equity is a key attribute of a viable regulatory decision, the role of expertise is limited." The problem is well highlighted when attempting to come to terms with adequately agreed upon criteria of risk and safety.

A useful way of defining "safe", one presently gaining currency, is as that level of risk judged acceptable. In this context, risk is defined as the probability that harm will occur at all multiplied by the severity of the consequence if it does occur. Thus risk objectively measures the potential hazard, while safety reflects a subjective judgment of the acceptability of that hazard. Risk is legitimately the subject of scientific investigation ... Scientists, however, cannot determine when something is safe or safe enough, because that is a matter of preference or judgment.

(1) Ibid., p. 3.

Does the group want to live with the risks described by the scientist as accompanying the product, pay for reducing the risks, or, instead, forego the product?(1)

The adequacy and success of the regulatory process can then be evaluated according to four basic criteria:

- 1) The regulatory decisions should reflect accurate perceptions of the known risks and of the uncertainties that come with using the product or technology. That is, the technical information upon which regulatory decisions are based must be objectively sound. And if there is a large degree of uncertainty about a major consideration, decisions should reflect that fact.
- 2) Regulatory decisions should reflect substantial political sensitivity. They need to balance or compensate for imbalances in the distribution of costs and benefits derived from use of the regulated product. If regulatory decisions do not reflect a sensitivity to distributional and value differences, given a reasonably democratic system of governance, public opposition to those decisions is sure to surface. That opposition will disrupt the regulatory process and may threaten the future of the regulatory authority.
- 3) Decisions should be timely and, for the most part, predictable. If they are not, delays and unproductive investment will inevitably alter the economics of the product and force suppliers and customers out of the marketplace for reasons that have nothing to do with safety. Inevitably, there will be constant tension between the authority's need to make rapid, predictable decisions and the need to resolve uncertainties and respond to constantly changing technologies and public attitudes.
- 4) The public should have confidence in the impartiality and competence of the regulatory body. Confidence leads the public to accept regulatory decisions without obstructing the process or demanding conclusive evidence of the authority's conservatism at every turn. It also denies any persistent challengers the broad political support necessary for meaningful opposition.(2)

(1) Ibid.

(2) Ibid., p. 5-6.

The foregoing considerations have then all come to impinge on the success, or lack thereof, of the nuclear industry in western industrialized countries; different factors being proportionally more important in one than the other. Thus, insofar as these countries have different socio-political and ideological traditions it is difficult to apply any particular model that can help us explain the essentials of the protest movement and the various governments' attempts to deal with it. While a pluralist model may be appropriate for the American context, with its tradition of public advocacy, this is not necessarily so for West Germany or France. As a consequence, our discussion will provide a contextual analysis trying to highlight similarities while also paying careful attention to the peculiarities of the particular case.

UNITED STATES

If there is one image that has come to represent the death knell of the nuclear industry it is that of Three Mile Island. Subsequent to the accident, the protest march by 100,000 people in Washington, D.C., on 6 May 1979, convinced anyone who was still uncertain that public opposition to atomic energy was very widespread. However, unbeknownst to the public at large, nuclear power development had been largely curtailed well before the Three Mile Island (TMI) accident. Nuclear power had become the victim of a lengthy interest-group struggle, wherein the nuclear industry on the one hand and the anti-nuclear environmental groups on the other had confronted each other in a variety of policymaking institutions: Congress, the Executive branch, state and local governments and, perhaps most importantly, the Nuclear Regulatory Commission and the courts.⁽¹⁾

(1) Constance Ewing Cook, Nuclear Power and Legal Advocacy, Lexington Books, Massachusetts, p. xi-xii. See also James R. Temples, "The Politics of Nuclear Power: A Subgovernment in transition," Political Science Quarterly, Summer 1980, p. 239-260. Temples provides a good overview of the regulatory process in the U.S., arguing that the federal government's role in the development and licensing of such plants from 1946 until the present may best be understood and explained

The most successful strategy used by the anti-nuclear movement in the United States was that of legal advocacy. Legal advocacy, refers to the interest-group strategy of filing suits to initiate judicial involvement in the nuclear power controversy, a process that includes both the courts and regulatory bodies. Before most lawsuits involving nuclear power issues can be filed, "rulings on the issues under contention must be made by the Nuclear Regulatory Commission (formerly the Atomic Energy Commission) which is the independent regulatory agency with statutory responsibility for setting nuclear plant standards and also licensing the plants." The Commission is, therefore, a quasi-judicial body itself; and its rulings represent the first phase in the judicial policymaking process. The interest group's "choice of strategy and its inclination to use legal advocacy and appeal the Commission's decisions to the courts are largely dependent upon its relationship with the Commission."⁽¹⁾

The political climate for the development of nuclear power was initially favourable. It was President Eisenhower who, in 1953, suggested the Atoms-for-Peace program leading to the commercial development of nuclear power. Succeeding presidents were equally optimistic about the potential of this energy source and, with the 1974 oil embargo, President Richard Nixon went so far as to propose that nuclear power eventually become

in terms of a nuclear subgovernment" that has changed over time as the nature of nuclear energy policymaking has shifted from what Theodore Lowi has called "distributive" toward what he terms "regulatory". John Abbotts, "Nuclear Power After Three Mile Island," Business and Society Review, Spring 80/81, p. 18-24. Abbotts argues that Congress and the Executive branch, in establishing and supporting private atomic power, failed to establish a mechanism to protect the industry from self-inflicted damage. Many of the significant delays in plant construction, according to Abbotts, are then attributable to the atomic industry itself.

- (1) Cook, p. xiii. In 1946 Congress enacted the Atomic Energy Act, which created the atomic Energy Commission (AEC); an agency with the dual purpose of promoting the development of atomic energy for national security and also controlling it to safeguard public health and safety. In 1954, the U.S. committed itself to the non-military use of atomic power through endorsement of the Atoms-for-Peace proposal. It was embodied in the 1954 amendment to the Atomic Energy Act which authorized and encouraged the development of nuclear power by private industry.

the source of over half the nation's electricity. It was not really until 1974, when President Gerald Ford took office, that the atomic energy issue became truly politicized. However, Ford enthusiastically endorsed the pro-nuclear position, calling for "faster licensing procedures to expedite the development of atomic power plants" and suggesting greater dependence on nuclear power in the U.S. and abroad. President Carter, on the other hand, emerged as considerably less supportive of the nuclear option. During the 1976 campaign, perhaps more clearly recognizing the undercurrent of emerging protest than did Ford, Carter argued that the United States dependence on nuclear power should be kept to the minimum necessary to meet American needs and urged that stronger safety standards be applied in its regulation. Following the election, Carter appointed several environmentalists to sensitive positions in major agencies, such as the Council on Environmental Quality and the Environment Protection Agency. Furthermore, when Carter appointed James Schlesinger, a former chairman of the Atomic Energy Commission, to head the newly created Department of Energy, Schlesinger disavowed personal advocacy of nuclear power.⁽¹⁾

As Presidential support for nuclear energy began to wane, so did that of the Congress. In 1954, Congress had established the Joint Committee on Atomic Energy (JCAE). The committee was composed of nine Representatives and nine Senators chosen by the Congressional leaders. In order to "avoid House and Senate conflicts and to capitalize on the committee's expertise in technical matters, the JCAE was initially given authority as the only joint committee able to sponsor legislation itself." Furthermore, all "nuclear-related matters were considered to be under its jurisdiction, and its members were usually strong supporters of atomic energy development." However, it was soon charged that, although the JCAE had been established as a watchdog of the Atomic Energy Commission, it underwent a transformation from being a healthy adversary to that of the AEC's leading apologist and protector.⁽²⁾

(1) Ibid., p. 3-4.

(2) Ibid., p. 4.

In 1974, Congress began to redistribute the JCAE oversight responsibility. In 1977, the JCAE was dissolved altogether and its legislative authority over commercial nuclear power was dispersed among a variety of committees in the House of Representatives. These included: Interior and Insular Affairs, Government Operations, Appropriations, Interstate and Foreign Commerce, and Science and Technology. In the Senate, the committees given some jurisdiction over nuclear matters included Energy and Natural Resources, Environment and Public Works, Government Affairs, Appropriations, Labour and Human Relations, and Commerce, Science, and Transportation. In addition, questions regarding nuclear weaponry and proliferation were to come before the Armed Services and International Relations Committees in the Senate. In each House, many of the numerous standing committees dealing with nuclear-related matters also had more than one subcommittee with jurisdiction over atomic energy issues. The result, of course, "was increased involvement by many legislators in the Congressional atomic energy policy-making process,"⁽¹⁾ and increased points of entry for lobbying activity. This was of more advantage to the anti-nuclear lobby than to the nuclear industry, for it meant that the "patron-client" relationship between the latter and the AEC/NRC had become fragmented. There were now more centres of entry for the anti-nuclear groups on the one hand, and more sectors to be convinced of the virtues of nuclear power by industry representatives on the other. Like their predecessors in the anti-war movement, the environmentalists "became skilled activists, confronting government and industry on a variety of issues, through a multitude of legal and legislative channels and at all levels of government."⁽²⁾ As they worked, environmental objectives gained currency and environmental groups gained political experience and sophistication.

(1) Ibid., p. 5.

(2) Rolph, p. 101. For a good discussion of how a legislator came to change his own mind over the nuclear issue, from pro to con, see Todd H. Otis, A Review of Nuclear Energy in the United States, Praeger, New York, 1981. Mr. Todd was a freshman legislator in the Minnesota House of Representatives (Dem.) who was asked to sponsor a bill proposing that no new nuclear power plants be allowed to be built in Minnesota until a safe and economically feasible means of disposing of the waste could be found.

Congressional committee changes were also accompanied by a reorganization of the bureaucratic organization controlling nuclear power. In 1974, Congress abolished the Atomic Energy Commission in response to public criticism regarding its "schizophrenic mandate to promote as well as regulate nuclear power." With the Energy Reorganization Act, Congress replaced the AEC with two separate agencies: the Energy Research and Development Administration (ERDA) which would recommend energy budgetary priorities and assume responsibility for energy research and demonstration programs, and the Nuclear Regulatory Commission (NRC) which would regulate nuclear power plants.(1)

The "politicization of the nuclear power issue and erosion of legislative support has been even more significant in some states and localities than in Congress." After Three Mile Island, the waning of Congressional support was evidenced by the introduction of a variety of bills mandating new procedures for dealing with nuclear plant licensing and/or new regulations for existing plants. Although the Atomic Energy Act gave the federal government full jurisdiction over the regulation of nuclear power for the protection of public health and safety, many states have sought to control nuclear development within their borders through restrictions on plant siting or through the regulation of rate structures and pollution control. For example, "in 1977, seven states passed laws prohibiting high-level waste disposal; and especially restrictive legislation regarding atomic power plants has been enacted in California, Maine and Oregon." Furthermore, anti-nuclear statutes, particularly with regard to transportation ordinances, have also been adopted by some individual towns and counties, especially in New England.(2)

Thus, what we find in the American situation is that numerous access points are embedded in the various levels and institutions of the

(1) Cook, p. 5. For a discussion of the importance of "access points" for the expression of opposition and how this can affect government policy see Jack N. Barkenbus, "Nuclear Power and Government Structure: The Divergent Paths of the United States and France," Social Science Quarterly, March 1984, p. 37-47.

(2) Ibid., p. 6.

political system, maximizing public participation. As a consequence, the process of making political decisions becomes extremely formalized, cumbersome and complex, resulting in bargaining among interest groups and politicians. The pursuit of pluralism, combined with the constitutionally mandated division of powers, produces a decision-making process better known for its safeguards than its efficiency or authoritativeness.

The anti-nuclear groups are motivated by a variety of factors. Their most immediate professed concern is with safety and they therefore pose a variety of technical questions regarding the safety of the development of atomic energy. However, underlying these questions is a fundamental commitment on the part of many environmental groups to abolish nuclear power altogether, science and technology often being identified with a deterioration in the quality of life. A second aspect underlying anti-nuclear sentiment is the dislike of industrial expansion. Many environmentalists favour soft energy sources while at the same time arguing on behalf of the "zero-growth concept" which, with respect to the amount of energy consumed, would maintain the status quo. The third and related anti-nuclear group motivation is the concern about high degrees of economic centralization, with the expansion of the business establishment leading to a greater gap between rich and poor. Because of the capital-intensive nature of plant construction, it is argued that atomic energy and big business are necessarily intertwined, therefore leading to the intermingling of an anti-business orientation with other anti-nuclear motivations.⁽¹⁾

In the United States, the impetus for concern was first provided over the issue of thermal pollution. Environmentalists, in the 1960s, discovered that the heat discharge from the cooling system of nuclear plants caused more eco-damage than that from other types of power plants. This concern with thermal pollution led to the groups' involvement in the nuclear regulatory process which, in turn, caused scepticism about the general safety of atomic power. The movement itself has remained fairly amorphous and the majority have remained local in nature, small in size, and often have formed in order to oppose one specific nuclear plant in their own area.

(1) Ibid., p. 10.

Given that their organization is basically ad hoc and fluid, most groups do not bother with membership lists or by-laws. However, many of these small groups have been coordinated with other local groups in loose federations, such as the Clamshell Alliance.⁽¹⁾ It has been estimated that there are about 20,000 voluntary environmental organizations in the United States. However, it was not until about 1973 that "big names in public interest circles, such as the Nader organization and the Sierra Club, joined the opposition to nuclear power."⁽²⁾

The anti-nuclear activities of the Nader organization are coordinated by Critical Mass. Critical Mass has helped various groups initiate state referenda, advises them on initiating state and local legislation to curb nuclear power, acts as a clearinghouse for existing and pending statutes, publishes a monthly newsletter on citizen efforts to stop atomic energy and has held national citizens' conferences to exchange anti-nuclear information. Critical mass is affiliated with 175 local citizen groups. Another group, initially sponsored by the Nader organization but now independent, is the Public Interest Research Group (PIRG). PIRG is a "student-based group held together with a professional staff and represented in about twenty states, as well as at the local and regional levels." A final organization worth noting, because of its influence on the debate, is the Union of Concerned Scientists (UCS). The UCS was formed in 1969, and "its most significant contribution to the anti-nuclear movement has been the

(1) The Clamshell Alliance is a coalition of local citizen groups which sprang up in opposition to a proposed nuclear reactor at Seabrook, New Hampshire. The concern around which it initially organized was the effect that the several billion litres of hot water the reactor would pump out each day would have on the clams and other sensitive ecology in the sea near the plant. On top of this, earthquake, radiation, and other hazards began to trouble increasing numbers of local people. On 1 August 1976, 18 local "Clams" walked onto the plant site. It was the first "occupation" of a plant site in the U.S.A. and it brought 600 people out in support. Three weeks later the Clams returned with 10 times their previous numbers. A support rally attracted 1,200. A year later 2,000 people occupied the site for 24 hours. In June 1978 more than 18,000 people returned to the site. See, Falk, p. 55-56.

(1) Cook, p. 11.

exposure of dissension within the scientific community on safety issues by gathering signatures from its members on reports that are critical of government regulatory policy and then publicizing these reports in the media." Thus, in August of 1976, the UCS sent an anti-nuclear statement to Congress with 2,300 signatures.(1)

The effectiveness of the anti-nuclear movement in the United States has then largely been the result of effective leadership, organization and strategy, the latter including both traditional and non-traditional political tactics. As Cook notes:

The funds that are available to anti-nuclear groups are often used to full advantage, thanks to the dedication of most environmental group leaders. In fact, effective leadership is the most significant organizational resource from which these groups benefit. The leaders of the environmental movement have been particularly good at utilizing all the political strategies, both traditional and non-traditional, potentially available to the groups, so that the anti-nuclear battle has been waged in a wide variety of arenas. Their tactics have included protests, demonstrations, civil disobedience, and other low-budget media events which compensate for the lack of more funding. A good example of one such media event was the release of balloons warning of radiation hazards at nuclear plant sites on the anniversary of the bombing of Hiroshima. A much more costly and significant media event, however, was the release in the spring of 1979 of a disaster movie called The China Syndrome. It starred anti-nuclear activists Jane Fonda and Jack Lemmon and effectively portrayed atomic energy as a very dangerous source of electricity and the nuclear industry as a business run by executives concerned only with the size of their profits.(2)

Along with their ability to form coalitions, another important resource at the disposal of the environmental groups has been legal expertise. Anti-nuclear groups, as with public interest groups in general, tend to be dominated by lawyers, thereby giving a "decidedly legalistic, litigation-oriented cast to public interest activity."(3)

(1) Ibid., p. 12-11.

(2) Ibid., p. 13.

(3) Ibid., p. 15.

In addition to the public interest law firms, one can also find traditional law firms that provide legal services for environmental groups either free of charge or at significantly reduced rates. It typically costs about \$100,000 for an anti-nuclear group to oppose an atomic plant through court action, but the pro bono work and foundation support have financed the litigation. As a consequence, many anti-nuclear groups have adequate organizational facilities and resources for the use of court action. As with all their other available resources, the environmental leaders have maximized the use of their legal expertise and funding as one of their many political strategies in the nuclear power controversy.⁽¹⁾

In coming to terms with the protest movement, the nuclear industry has continually tried to stress the economic viability of nuclear power. Underlying this one finds two further attitudes that motivate the commitment of nuclear proponents. First, the industry is by definition comprised of technicians and scientists whose work consists of devising solutions to technical problems. Thus, their own experience tends to make them scientific optimists convinced that any remaining safety questions associated with nuclear power can be solved. Secondly, there is the prevalent belief that improved living standards necessarily involve industrial growth. If industrial expansion is the key to a better quality of life then an increased consumption of energy becomes the obvious corollary.

The proponents of nuclear energy are no less convinced about the virtues of their beliefs than is the anti-nuclear lobby. However, despite its being more structured and having readier access to financial resources, the industry lobby has not been nearly as successful as the protest movement in achieving its aims. The industry's most representative and active trade association is the Atomic Industrial Forum (AIF). The AIF members include the 37 or so utilities which own and operate nuclear power plants in the United States. In addition, one also has as members the various reactor manufacturers or vendors, architect-engineering firms and uranium mining companies. Along with a variety of technical functions, the AIF is a lobbying organization that distributes public information, conducts

(1) Ibid.

seminars for company representatives to help them learn how to better promote atomic energy, and engages in public relations campaigns.(1)

A second important trade association within the industry is the Edison Electric Institute (EEI), of which all the private, investor-owned utilities are members. Besides serving as a communications link for the utilities, the EEI funds electrical research, provides information and statistics on the industry and engages in national public relations efforts. It also encourages and guides the utilities in the conduct of their own marketing efforts, and it seeks to improve the industry's image through the distribution in schools of books and games. In 1978 the EEI merged with a separate lobbying group, the National Association of Electric Companies (NAEC), in order to expand its lobbying activities.(2)

A third group with a strong vested interest in the development of nuclear power is the American Nuclear Society (ANS). The ANS is a professional society with a membership of over 12,000 and represents individuals employed in universities and government agencies as well as in corporations. The ANS tries to encourage and facilitate individual political activities by distributing a newsletter about proposed Congressional legislation to the members of its Nuclear Supporters Program. The ANS also has a lobbying arm called the American Nuclear Energy Council (ANEC) which acts as an information clearinghouse and aids the various industry lobbyists in Washington by developing common approaches, thereby making it the most effective political action organization. The utilities themselves work for the promotion of nuclear power in a variety of ways. Thus:

Company newsletters may discuss nuclear issues, provide rebuttals to critics of nuclear power and urge employees to contact government officials to express pronuclear views. Similarly, the electric companies sometimes do pronuclear public advertising in the media or in mailings to their customers when state regulatory agencies permit it. Utilities and other nuclear-related industries have also tried to carry the nuclear message to the public with participation by well-informed employees

(1) Ibid., p. 16-17.

(2) Ibid.

in company speakers' bureaus. Local organizations and schools can then request utility speakers for meetings to learn about nuclear power.... Finally, some utilities and most corporations involved in the nuclear industry have their own state and/or federal lobbyists, and funds for the campaign use of pronuclear legislators may come from the coffers of voluntary employee political action committees.(1)

While the major U.S. utilities and other component parts of the nuclear industry have a strong vested interest in the promotion of this energy source, it is important to note that none of these are wholly dependent upon atomic energy. Power companies have the major portion of their operating capacity for electric generation in non-nuclear plants, the architect engineering firms also design fossil-fired plants, reactor manufacturers produce equipment for non-nuclear plants; and the majority of the large uranium mining firms are primarily oil companies. Consequently, "in the battle over the future of nuclear power, these companies are probably not fighting for their ultimate survival." Perhaps as a result, the extent of their commitment of resources to the pro-nuclear cause has usually been fairly limited.(2)

A major handicap suffered by the industry is its lack of an active minority of a few obvious, long-term leaders who have primary influence over policy decisions, act as spokespersons for the industry, and are known media figures. As a result, the nuclear interest group has relied upon scientists, academics or government agency heads to be its surrogate spokesmen. The problem with such an approach is that these individuals do not always concur with all the industry's positions and, in fact, usually go to great lengths to demonstrate their financial and intellectual dissociation from the nuclear industry, while advocating the development of atomic energy. It is perhaps due to the absence of activist, visible leadership in the nuclear industry, that the interest group has not taken full advantage of the various political strategies available to influence nuclear power

(1) Ibid., p. 18-19. See also Herman Nickel, "Talking Back To the Anti-Nukes," Fortune, January 1980, p. 108-110.

(2) Cook, p. 21.

policymaking. The industry has most often engaged in the traditional forms of lobbying and has, in the past, largely refrained from utilizing other more innovative tactics. For example, the many employees of the nuclear-related firms, as well as stockholders of those companies, have rarely been recruited for political action: letter writing to officials, campaign work, political donations, and other grass roots lobbying efforts. Another organizational resource which the nuclear industry has not fully utilized is its potential formation of coalitions with a variety of other interest groups. Thus, although organized labour has generally been supportive of the industry, little has been done to tap this potential support base.⁽¹⁾

In comparing the two interest groups involved in the debate we find that the nuclear industry has not significantly benefitted from an organization that is more structured than that of the anti-nuclear environmentalists. The major disparity between the resources of the two sets of interest groups involves their respective leadership. The anti-nuclear groups benefit from visible, activist leaders who have a strong personal commitment to their cause. Because of the leaders' organizational ability and political acumen, they have done better than the nuclear industry in mobilizing support from members and coalition groups. Through their effective use of points of entry into the decision-making process, particularly with regard to the regulatory system and the courts, the anti-nuclear activists have consistently won the day. By extending the licensing process with lengthy litigation, the environmental groups have added substantial costs to plants whose construction period is extended or whose operation is delayed pending a court decision. The nuclear industry in the United States has been demoralized by the threat and use of legal advocacy and has sometimes accepted expensive out-of-court settlements to avoid further adjudicatory delay. As a result, the content of the judicial output of rulings favourable to the nuclear industry has been superseded by the impact of the duration of the judicial process.⁽²⁾

(1) Ibid., p. 22.

(2) Ibid., p. 48.

FRANCE AND GERMANY

After World War II France's first postwar government, formed by the returning Gaullists and the resistance movement with its significant socialist and communist influence, implemented nationalization programs in key industrial sectors. The subsequent "importance of this nationalized sector and the early ties between the civil and military aspects of nuclear power in France established from the beginning a pattern of strong central government control over nuclear policy.⁽¹⁾ This control is still intact today, unfettered by legislation dealing specifically with nuclear technology.⁽²⁾

In 1945 the Commissariat à l'Energie Atomique (CEA) was set up as the centre for nuclear research and development. As nuclear energy became commercialized in the late 1960s, Electricité de France (EDF), the state-owned utility, assumed increasing control. It is these two administrations that have determined government policy in the nuclear field. In 1957 the government established the Commission Consultative pour la Production d'Electricité d'Origine Nucléaire (PEON) to coordinate the activities of the CEA, EDF, and the related industries. The members of PEON represent EDF, CEA, the ministries of industry, planning and finance, and the directors of the major industries involved. Together, they initiated the civilian nuclear energy program.⁽³⁾

EDF is one of France's largest companies, employing over 120,000 people and investing over \$2 billion each year. The long-term debts and loans necessary for continuing the nuclear program corresponded to 65% of EDF's real estate values. This level of investment required capital from

(1) For a discussion of the early development of French nuclear policy, see L. Scheinman, Atomic Energy Policy in France Under the Fourth Republic, Princeton University Press, Princeton, 1965. Also, J.C. Bupp and J. Derian, Light Water: How the Nuclear Dream Dissolved, Basic Books, New York, 1978.

(2) Nelkin and Pollak, p. 12.

(3) Ibid., p. 13.

the national and international market and inevitably limited the degree of significant public control over EDF's strategies. To the left, "viewing EDF's nationalized status as an important structural reform in a capitalist country, its financial policies represent an erosion of a national enterprise by private capital." EDF's contracting policies, favouring economic concentration, represent a monopoly situation in which the government, through stockholding, subsidizes a private corporation, Creusot-Loire. Besides Framatome, Creusot-Loire controls Novatome, formed in 1977 to develop the fast-breeder program. Creusot-Loire is also directly linked to the suppliers of plant components through Empain-Schneider, the third largest financing group in France.⁽¹⁾ The structure of the French nuclear industry is highly centralized, with development objectives mainly set by the government.

While in France private influence over the administration's nuclear policy developed only over the last 10 years, in Germany private industry has always played a central role. Germany had no nuclear program during the early 1950s because the building of a German nuclear industry was forbidden by the Allied forces until 1955. Only at the end of its status as an occupied nation was the Federal Republic even allowed to do research and development in this field. As a result, Germany had to fill a technological gap in a situation of competitive disadvantage. Germany's strategy, therefore, followed a different pattern from that of France. Politically unable to build a military nuclear program, the Germans saw less need to develop their own technology. The absence of a military goal also limited the involvement of the public sector. Thus, development of nuclear power relied heavily on private industry, and as a result German nuclear policy from the start was oriented to private economic interests, considerations of profitability, and future export possibilities. The strategy was to use foreign help -- information, raw materials, and technology -- to build up a nuclear industry able to meet national needs and later to conquer export markets. The organization of the governmental nuclear administration reflects this strategic choice.

(1) Ibid., p. 14.

The ministry of atomic energy and the German atomic commission were established in 1956. The members of the commission included eight scientists ... two representatives of the administration (one of them the minister himself), thirteen representatives from large industrial corporations, two from financial institutions, and two from the labor unions. This membership reflects two objectives: to promote harmony and collaboration among industrial sectors involved in the development and use of nuclear energy and to develop a strong program by bringing together key German experts having important international contacts.(1)

Although electricity generation and supply in the Federal Republic are officially in the private sector, public authorities are major shareholders in the big utilities. The two giants, Rheinisch-Westfälische Elektrizitätswerke A.G. and Veba A.G., alone produce more than 50% of the nation's electricity; both are largely controlled by the state through shareholding. The presence of federal and Länder (state) representatives on the administrative boards of the major utilities could guarantee public control of their strategies. But in fact the energy policies planned by the Länder and federal governments are based on the forecasts prepared by these firms. In turn in their nuclear investments the firms depend on their long-term relationships with Siemens (a major corporation in the electronics industry); even the banks that provide financial guarantees are stockholders of the nuclear corporations. As a consequence, many interests converge to support nuclear energy and minimize the financial risk of the investment required.(2)

Despite certain differences, an oligopoly situation with virtually no competition prevails in both countries. In France the state is a shareholder of the supplier firm and in Germany public authorities are shareholders in major utilities. In both countries, those who occupy key positions in the social network of the nuclear establishment -- the government sector, the interested scientific community, and the private firms -- share a stake in defending their decisions, investments and

(1) Ibid., p. 15.

(2) Ibid., p. 17.

interests, and this maintains their commitment to expand the nuclear power program. However, the existence of "oligopolies" has not been of equal benefit to nuclear industries in the two countries: the French nuclear industry is thriving while that in West Germany has all but ground to a halt. To a large extent, the reasons for this have to do with the different administrative styles of the two countries and how these affect the protest movements' ability to gain access in their attempt to affect public policy.

The French nuclear program is a priority of the country's strong central government and industrial leaders. The income and jobs that nuclear power provides are a strong incentive to continue the program. Both the steel and heavy electrical industries, two important sectors of the economy, are heavily dependent on the nuclear program. Decision-making is centralized and French courts give the sporadic political opposition to the nuclear program little opportunity to intervene. Furthermore, government public relations campaigns dissuade local communities from opposing proposed plants. Indeed, economic realities have proved much more hazardous to the French nuclear program than political opposition.

Electricity growth has been gradually slowing since the late seventies, and the government, projecting annual growth in electricity demand of 5.6 percent as recently as 1981, finally reduced its 1990 growth forecast by 50 percent in 1982. These figures mean that France will have at least 13 percent too much generating capacity in 1990. Furthermore, the country may be generating well over 80 percent of its electricity from nuclear power. Such a high proportion means that some nuclear plants must be used intermittently to match fluctuating daily demand. This poses a major technical challenge and hurts the economics of nuclear power.(1)

The French nuclear program, though successful politically and in narrow economic terms, has become the victim of its own success.

(1) Christopher Flavin, "Nuclear Power: The Market Test," Worldwatch Paper No. 57, December 1983, p. 46. For a comparison of the role of political parties in the nuclear debate see, Dorothy Nelkin and Michael Pollack, "Political Parties and the Nuclear Energy Debate in France and Germany," Comparative Politics, Vol. 12, No. 2, January 1980, p. 127-141.

Its large scale and the dearth of political opposition have helped reduce costs but have also made it hard to adjust to economic difficulties and lower electricity demand. The future of nuclear power in France will be decided largely on political grounds, but France's leaders will find it increasingly difficult to justify ordering new units in the future. European nuclear analysts William Walker and Mans Lönnroth, assessing the French nuclear industry, concluded in 1983 that, "It risks a vicious circle of rising costs, higher electricity prices and even lower growth rates. A long period of drought therefore seems imminent for the French nuclear industry." In the 1990s France will almost certainly be generating more nuclear electricity per person than any other country.⁽¹⁾

In West Germany, opposition to nuclear power has mushroomed since the late seventies. It is part of a broader questioning of the future of German society, spearheaded by the country's Green Party, which has made the dissolution of the nuclear power program its top priority after the elimination of nuclear missiles in Europe. Major demonstrations have occurred at many nuclear plant sites, including one near Hamburg in 1981 that the West German Interior Minister described as the biggest police action in the history of the Federal Republic. Much of the opposition to nuclear power arises out of local concern about proposed nuclear plants. In the Federal Republic, the Länder governments have the final say on nuclear licensing decisions, and opponents have successfully raised issues of safety, environmental damage and cost-effectiveness at hearings and in the courts. Design standards have been frequently upgraded and many plants altered substantially. As a result, project delays and cost overruns closely parallel those in the United States.⁽²⁾

The "federal" nature of the German administrative system has then tended to provide more access points for protest movements than the highly centralized system in France. The power of the highly centralized administration in France derives in part from the administrative and political fragmentation of French society. France is divided into about

(1) Ibid., p. 47.

(2) Ibid., p. 44-45

38,000 communes. In one sense "this allows a great deal of civic involvement; France has about 470,000 municipal councillors, or about 170 for every 10,000 voters (about five times as many proportionately as in the United States)." However, important decisions are made in Paris and implemented through the authorities of the 95 departments appointed by the central government and the departmental services of the technical ministries. The "overwhelming power of the central bureaucracy over local government is justified by the jacobin and republican tradition which sees the central government as the guardian of the general will, transcending the politics of special interests."⁽¹⁾

In Germany, implementation of national policies in most areas requires political accommodation with the elected Länder and local authorities. The present federal structure "derives from the nineteenth century when the unification of the nation brought about by Bismarck left administrative autonomy to the Länder." The Weimar Republic reinforced centralized authority, but the postwar reconstruction of political life, influenced by the Allied occupation and the Anglo-Saxon ideology of local democracy, strengthened the federal tradition and the pattern of administrative decentralization. The 10 Länder of the Federal Republic vary in size and population, from Bremen with a population of 700,000 to North Rhine-Westphalia with over 17 million inhabitants. Within each Land local government units provide many services and local authorities have links with representatives on federal advisory councils.⁽²⁾ In such a federal system, local concerns and responsibilities can then often help foster protest against central authorities.

In both France and Germany government officials were not prepared for the intensity of the opposition to nuclear power. To many officials the movement appeared as an attack against the state, science and technology, modernism, and the public interest. Government response to the protests included a variety of information programs intended to win public consent, repressive measures to intimidate opponents, and institutional or

(1) Nelkin and Pollak, p. 26.

(2) Ibid., p. 27.

procedural changes to co-opt critical groups. The character of the responses themselves reflected the traditional attitudes toward dissent and the differences in political organization of the two countries. Thus, in France, "where dissent and demonstration have been a ubiquitous feature of the political culture, protest is often dismissed more as a resistance to change, a defense of special interests, or as a result of public ignorance than as a major political challenge." In Germany, on the other hand, the nuclear protest raised questions of legality, and constitutional principle. Officials often tend to attribute opposition to "communist infiltration or anarchism." Protest raises "anxieties that radical dissent could destroy social order, and consensus becomes a crucial objective."⁽¹⁾

The initial attempt, on the part of both governments, to deal with protest entailed information programs. The French government, regarding nuclear policy as a technical implementation of its energy plan, left the burden of public information to EDF. The utility distributed information on nuclear power as part of its effort to promote energy consumption; dismissing the opposition as obscure radicals. Along with this EDF also brought local officials, members of parliament and the press to model power plant sites. In 1975 the government appointed a delegation to coordinate information on nuclear power and help regional councils participate in the consultation procedures required to site power plants. EDF also formed a nuclear information group and opened a documentation centre in Paris, making available technical information on reactor safety.⁽²⁾

In 1977 President Valéry Giscard d'Estaing announced the creation of the Conseil d'Information sur l'Énergie Électro-nucléaire. The 18-member council included mayors of several municipalities containing nuclear plants, environmentalists, physicians and journalists. The council reviews the information on nuclear power available to the public, evaluates its quality and completeness and, on the basis of scientific consensus, recommends what should be publicized. It can neither generate its own information nor force material to be released. In its evaluations, the

(1) Ibid., p. 167.

(2) Ibid., p. 169.

council must assume there is consensus among scientific elites; its function is mainly to discover this consensus to judge what should be presented as fact to the public.(1)

While the French information program was a "one-way" effort of public education, the German program was a citizens' dialogue. Far more participatory and based more on adversary principles than expertise, the German information program reflected a very different perception of the role of the public in decision-making. The citizens' dialogue was to provide information on the position of the federal government, to promote political and technical discussion, and to support opinion-forming activities within adult education groups, churches, labour unions, parties and other associations. The government organized its own public discussions and supported debate organized by parties, labour unions, the churches and adult education institutions. It insisted that in all meetings both pro- and anti-nuclear viewpoints be expressed and provided substantial financial support to this end. The structure of the program encouraged public debate, and the anti-nuclear initiatives skilfully and effectively used the dialogue to publicize their own viewpoint and increase their own influence and credibility. Although it is difficult to assess the effect of the citizens' dialogue on public attitudes toward nuclear power, it did expose thousands of people to the controversy and might well have reinforced their scepticism. In addition, the dialogue clearly gave political leaders some sense of public opinion.(2)

The contrast between the nuclear information policies in France and Germany reflects different concepts of democracy: the "French elitist information model corresponds to a style of policy-making that derives democratic legitimation from electoral majorities; the German participatory model corresponds to its cooperative policy-making process, in which democratic legitimation proceeds through a consensus among major social forces."(3)

(1) Ibid., p. 171.

(2) Ibid., p. 172.

(3) Ibid., p. 173.

Intimidation is another method used by governments to deal with protests. However, public scrutiny and accountability limit the use of force to contain dissent. Whenever police entered to break up anti-nuclear demonstrations, public attitudes polarized and government credibility suffered. To avoid the loss of legitimacy that follows the use of force, governments seek benign means of control. These may include research restrictions, employment threats or personal harassment. Such tactics have been prevalent in France. In Germany where the anti-nuclear movement is often associated with radical anti-constitutional behaviour the legal possibilities of harassment are greater than in France. According to an agreement in 1972 among the ministers of the interior of the German Länder (confirmed by the constitutional court in 1975), candidates for civil service positions (15% of the employed labour force) must guarantee that they will actively stand for the liberal-democratic constitutional order. This agreement, the Radikalenerlass, has "led to routine inquiries on the political past of candidates. Newspapers and magazines have reported numerous cases where the Verfassungsschutz investigated antinuclear activists and labeled them anticonstitutional."(1)

Co-optation and Delegitimation can also be added to the list of tactics used by administrations to diffuse dissent. To mobilize political support for its policies, the German government encouraged the formation of pro-nuclear citizen initiatives. In 1978 secretary of state for environmental protection in the federal ministry of the interior, Gunter Hartkopf, proposed that "industry should create its own citizen groups." Industrial representatives took the advice and today some 20,000 people belong to pro-nuclear citizen initiatives, created and financed by nuclear firms. The German government also tried to integrate the anti-nuclear and environmental movements into the conventional political process. In 1971 it formed the Arbeitsgemeinschaft für Umweltfragen (AFU), a consortium of 150 organizations including environmental associations, ministries, public authorities, and private firms, to promote public awareness of environmental problems and

(1) Ibid., p. 174-175. By 1979 the governmental coalition parties, SPD and FDP, abandoned routine inquiries into the political attitudes of civil service candidates.

to propose and review legislation. In France the effort was less to co-opt the anti-nuclear movement than to discredit it. The government is relatively independent from social-bargaining procedures and hardly interested in developing structures that would further complicate its work. It rather seeks to "turn people away from the more politicized ecology groups and minimize the political salience of the nuclear issue." In Germany, on the other hand, the bargaining process that takes place prior to policy decisions encourages efforts to support those social forces in agreement with the government and organize groups that could one day enter the social partnership. The contrast in the government response to the antinuclear movement in France and Germany reveals some striking ironies.

The French government uses less intimidation in its response to radical forms of opposition but has few procedures through which critics can obtain information or influence decisions. The German government is more willing to enter into negotiation with ecologists and has a more open information policy but reacts more vigorously to radical dissent. However, in both countries the extensive experimentation with informational and procedural innovations largely failed to integrate the antinuclear movement within the framework of traditional political life.(1)

In our examination of these two countries, it quickly became apparent that "high technology creates a basic political dilemma." Government dependence on industry for technological development inevitably reduces political credibility. Caught by the need to maintain an image of liberal-democratic behaviour on the one hand, and by the constraints imposed upon them by their alliance with business interests on the other, the two governments "could only oscillate between declarations of good will on the one extreme and repression of protest to maintain order on the other."(2)

In Germany, the greater range of tactical oscillation is due to the decentralized structure and the interpenetration between government and a variety of social forces. Government agencies and ministries tend to

(1) Ibid., p. 175-183.

(2) Ibid., p. 182.

be tied to specific constituents, but must also integrate new social movements into the policy process. As a consequence, contradictions and intra-governmental conflicts are inevitable -- between regional and national governments or between environmental agencies and the ministry of economics. The anti-nuclear movement increased its own influence by exacerbating such intra-administrative conflicts and the resulting inconsistencies in government policy then reinforced rather than reduced public mistrust.(1)

In France, by contrast, a centralized administration allows the government to ignore social movements. In the end it was less the government's response to the anti-nuclear movement than its power to implement policy despite continued protest that allowed France to continue her nuclear program while Germany's is indefinitely delayed.(2)

BRITAIN

In comparison to the French and German nuclear programs, that of Britain is rather anaemic. The high cost of British nuclear plants built so far and forecasts that electricity demand will be steady or even fall in the next decade provide ample economic hurdles to a revitalized nuclear construction program.(3)

In Britain, the 1960s and early 1970s were periods of ambitious nuclear expansion. As in France, the exercise of central authority is relatively unrestricted and all aspects of the nuclear fuel cycle are tightly and formally incorporated as operations of state agencies. Where resistance has occurred it has flared up on the periphery.

In 1956 the first commercial reactor began operation in the U.K. and seven more were completed by the end of the 1950s, making the U.K.

(1) Ibid.

(2) Ibid.

(3) Flavin, p. 48. See also Peter Lloyd Jones, The Economics of Nuclear Power Programs in the United Kingdom, Macmillan Press, London, 1984.

the then world leader in civilian nuclear power. Subsequent plants were built throughout the 1960s and by the time the program came to a halt Britain had almost 12 GWe of nuclear power. Most of the sites were situated away from major population centres in East Anglia, the Severn Estuary, north England, Scotland and Wales.⁽¹⁾

It was not until 1975 that opposition to nuclear power became at all noticeable. A network of environmental groups called Friends of the Earth (FOE) set up over the years had been consistently confronted by a Parliament in which all parties were supporters of the nuclear option. However, their efforts were crucial in documenting and making more widely known the fragility of the economic case for nuclear power and its hazards. The only success achieved in the centre of the political arena was "tacit agreement by the government that major projects should be subjected to a process of open public inquiry."⁽²⁾ By agreeing to a process of public inquiry the government merely hoped to legitimize its position by demonstrating that all reasonable channels had been exhausted before final decisions were made, thereby hoping to diffuse the protest movement.

However, this process of "legitimation" failed. In March 1977 British Nuclear Fuels Limited (BNFL) submitted a formal application to build a reprocessing plant which would be capable of extracting some of the plutonium and uranium from modern reactor spent fuel rods. Protestors quickly objected, pointing to the hazards of regular cross-country shipments of plutonium and eventually the construction of fastbreeder reactors. In June 1977, the Windscale Inquiry began a long set of hearings into the proposal. After much effort the final report proved a disappointment, leaving little room for an "understanding of the objectors' case." Having found that the "legitimation process" was strictly an orchestrated forum, used by the government to help it achieve its predetermined goals, the protest movement decided to take its stand outside the system. On 29 April 1978, 10,000 people packed Trafalgar Square to demonstrate against the

(1) Falk, p. 175-176. One GWe (gigawatt) = 1,000 million watts.

(2) Ibid.

Windscale expansion plans. It was the first large anti-nuclear power demonstration held in Britain.⁽¹⁾

Further demonstrations ensued and as the "central programs" for nuclear development continued, the opposition on the periphery increased. However, as already noted, it was the economic situation and not the protest movement that proved to be the decisive factor in slowing down the British nuclear program. Had the program continued apace it is likely that "cracks" would have been forced into the solidity of the central authority, much as in West Germany, providing a channel through which opposition could have flowed from the periphery to the centre.

CONCLUSION

In our examination of the different nuclear programs, it quickly became apparent that the nature of the protest and the manner in which it was handled depended upon the particular decision structure as well as socio-political traditions. Thus, the effectiveness of the American protest movement was the consequence of a well-established tradition of legal advocacy and a pluralist political system. The protestors were then able to find several "points of access" in their attempts to influence the decision process. In France and Britain, the highly centralized state did not find legitimation to be a matter of major concern, although certain concessions were made in that direction. In the more centralized states the protest began on the periphery and took longer to coalesce than in the pluralist U.S. In West Germany the desire for "social consensus," with its tradition of collective decision-making, provided the "crack" by which access to the centralized decision-making process was finally achieved. The federal nature of the administrative process also proved crucial to the eventual success of the protest movement.

(1) Ibid. See also, Martin Scott and Peter Taylor, The Nuclear Controversy: A Guide to the Issues of the Windscale Inquiry, The Town and Country Planning Association, London, 1980.

The protest movement was not only successful in the major industrial countries. For instance, in late 1978, after years of anti-nuclear demonstrations and an extensive government information campaign, the Austrian people turned down their nuclear energy program in a national referendum. The vote in Austria was close but definitive -- a result that came as a shock to the socialist government, which along with industry and the labour unions was committed to the technology. A nuclear power plant costing over \$500 million -- a considerable investment for a small nation -- was all but ready to go into operation. After the referendum this project was abandoned.

The "burden of proof," if one may call it that, has now shifted to the promoters of nuclear energy; the nuclear establishment must convince the public that the problems concerning the safety of power plants and the critical elements of the fuel cycle (reprocessing and waste disposal) are technically under control. This is perhaps the major policy significance of the nuclear controversy.

